

DOCUMENT RESUME

ED 323 108

SE 051 562

AUTHOR Ellis, Carol; McDaniel, Nan
TITLE Introduction to Apple LOGO, Parts 1, 2, 3 and Task Cards--Level I.
INSTITUTION Spartanburg County School District 7, S.C.
PUB DATE 84
NOTE 105p.; For related document, see SE 051 561.
PUB TYPE Guides - Classroom Use - Materials (For Learner) (051)

EDRS PRICE MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS Computer Graphics; *Computer Uses in Education; Elementary Secondary Education; Estimation (Mathematics); *Geometry; *Individualized Instruction; Mathematics Education; *Problem Solving; *Programing Languages; *Secondary School Mathematics
IDENTIFIERS *LOGO Programing Language

ABSTRACT

This series of units is designed to help middle, junior high, and high school students use LOGO computer language as a tool to explore concepts in geometry, estimation and problem solving. The format of the unit was designed so that the instruction can be provided by the classroom teacher. The lessons are constructed so that, with some teacher guidance, the students can work through them step by step. Follow-up activities for each lesson provide students with an opportunity to apply what they have learned in the lesson sequence. Challenge assignments provide additional stimulation for students who learn the language more quickly than others. Included in this document are parts 1, 2, and 3 of the "Introduction to Apple LOGO" program and 15 task cards. The program includes 14 lessons. (CW)

* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *

ED323108

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)

☒ This document has been reproduced as
received from the person or organization
originating it.

☐ Minor changes have been made to improve
reproduction quality.

• Points of view or opinions stated in this docu-
ment do not necessarily represent official
OERI position or policy.

"PERMISSION TO REPRODUCE THIS
MATERIAL IN MICROFICHE ONLY
HAS BEEN GRANTED BY

John Tilletson

TO THE EDUCATIONAL RESOURCES
INFORMATION CENTER (ERIC)."

INTRODUCTION TO APPLE LOGO

PART ONE



Spartanburg County School District No. 7
Spartanburg, South Carolina

1984

SE051562

INTRODUCTION TO APPLE LOGO
PART ONE

Developed by: Carol Ellis
Nan McDaniel

Copyright 1984 Spartanburg County School District No. 7

Spartanburg County School District No. 7
Spartanburg, South Carolina

1984

LESSON 1 SHOWTURTLE, FORWARD, BACK, LEFT, RIGHT, CLEARSCREEN, HIDE TURTLE, HOME

HOW TO TURN ON THE COMPUTER

1. Find the disk named APPLE LOGO.
2. Hold the disk with the label up and your thumb on the label.
3. Put the disk carefully in the disk drive and close the door.
4. Check to be sure the CAPS LOCK key on the keyboard is down.
5. Switch on the monitor.
6. Reach behind the computer at the left side and turn on the switch.

When the red light on the disk drive is off, the display should say

PRESS THE RETURN KEY TO BEGIN.
IF YOU HAVE YOUR OWN FILE DISKETTE,
INSERT IT NOW, THEN PRESS RETURN.

Just press RETURN. When the red light goes off, the display will say

WELCOME TO LOGO

? 

The blinking  is called the cursor. The cursor tells you where the next letter you type will appear on the monitor.

Remove the APPLE LOGO diskette from the disk drive. Put it in the sleeve and store it as your teacher directs you.

THE SHOWTURTLE COMMAND

Type: SHOWTURTLE

and press RETURN.

SHOWTURTLE puts a triangle called "the turtle" in the center of the monitor. The cursor moves to the bottom section of the screen.

HOW TO MOVE THE TURTLE

When we say "enter," we will always mean to do these two things:

- (1) type a line,
- (2) then press RETURN.

Enter this line: FORWARD 50

What happened? _____

Note the Ø in FORWARD 5Ø on your monitor.

How is the Ø different from the O in FORWARD? _____

The computer uses two different symbols so you will know whether you typed zero (0) or the letter O.

Enter this line: RIGHT 90

Did you remember to press RETURN?

What happened? _____

Now enter these lines:

FORWARD 50
RIGHT 90
FORWARD 50
RIGHT 90
FORWARD 50
RIGHT 90

(Don't forget to
press RETURN
after each line.)

What did the turtle draw? _____

Now enter these lines:

BACK 50
LEFT 90
FORWARD 50
RIGHT 135
FORWARD 71
LEFT 45

What did the turtle add to the first drawing? _____

HOW TO CLEAR THE SCREEN

To try something new, you need to clear the screen. Enter the line

CLEARSCREEN

(Don't forget to press RETURN!)

The turtle is now in the HOME position.

The turtle can draw many geometric shapes. Some of these shapes are listed below. On the lines provided, write a definition of each shape.

square: _____

rectangle: _____

right angle: _____

triangle: _____

right triangle: _____

isosceles triangle: _____

equilateral triangle: _____

scalene triangle: _____

trapezoid: _____

rhombus: _____

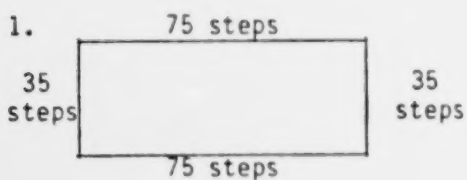
pentagon: _____

hexagon: _____

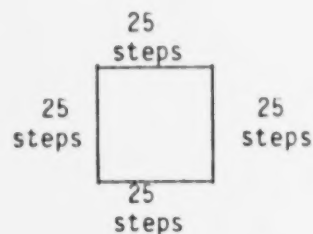
octagon: _____

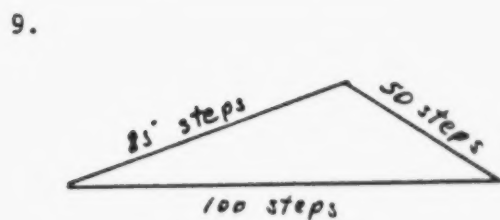
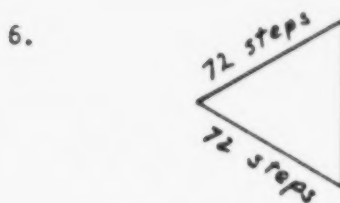
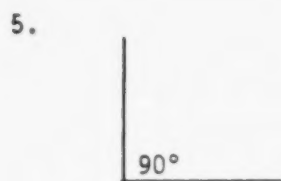
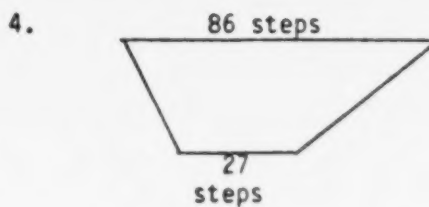
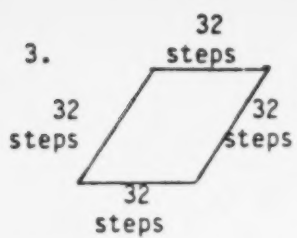
Exercise 1: Examine each of the following shapes. Write each shape's geometric name on the line provided.

1.



2.





USING SHORT NAMES FOR THE COMMANDS

You can enter lines a lot faster if you learn these short names for the basic LOGO commands:

FD = FORWARD
BK = BACK
RT = RIGHT
LT = LEFT
CS = CLEARSCREEN
ST = SHOWTURTLE

Enter these lines to see how the short names work.

RT 90
FD 35
LT 60
FD 50
RT 60
BK 75
HOME
HT

What did the turtle draw? _____

What does HOME mean? _____

What happened to the turtle? _____

What command made the turtle do this? _____

HT is the short name for HIDE TURTLE. It makes the turtle disappear so you can see the whole drawing.

Can the turtle still draw even though you can't see it?

Enter BK 20

What happened? _____

What command do you enter to show the turtle? _____

Enter the short name for that command.

THE WRAP FEATURE

Clear your screen.

What happens when you enter FD 150? _____

Now enter FD 25. What happens? _____

This is called wraparound. It makes sure that the turtle returns to the screen. If you move too far to the right, it reappears on the left. If you move too far up, it reappears at the bottom of the screen. The wraparound feature limits the turtle to an area that is about 280 steps from left to right and 240 steps from top to bottom.

You can complete the line you've just begun by telling the turtle to return to HOME position.

Enter HOME

Now clear the screen so you can try these assignments.

ASSIGNMENT 1: DESIGNS WITH THE TURTLE

Draw each of the following using FORWARD, BACK, RIGHT, and LEFT. Write the commands you use by each figure. NOTE: If you need more lines, draw them in. Have your teacher check your work and initial your booklet before you clear a completed assignment from the screen.

Square



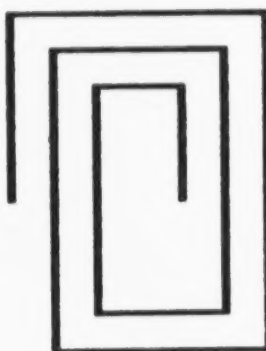
Rectangle

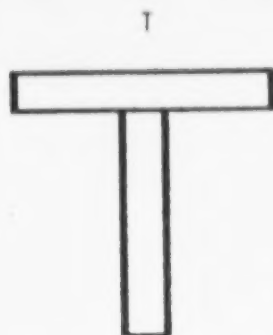


Stairs



Spiral

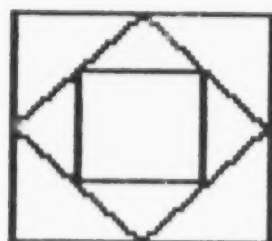




A design of your own.
Draw it here.

LESSON 1 CHALLENGE

Write a series of commands that will make the turtle draw this:



LESSON 2 TO, END, SAVE ", EDIT ", CONTROL -C, CATALOG, ERALL

HOW TO WRITE A PROCEDURE

The turtle has a limited vocabulary. You have already learned the main words the turtle knows.

You can teach the turtle new words by giving it instructions in a procedure.

Show the turtle.

Enter RECTANGLE

What does the computer say? _____

You can teach the turtle how to rectangle by entering these lines:

```
TO RECTANGLE
FD 50
RT 90
FD 95
RT 90
FD 50
RT 90
FD 95
RT 90
END
```

What does the computer say when you have finished? _____

Did the turtle draw as you gave the commands? _____

Now ask the turtle to rectangle. Enter RECTANGLE.

What happens? _____

You have just taught the turtle a procedure. When you enter the word TO, that tells the turtle that you are going to start a procedure. Notice that the turtle did not carry out the commands. The ? which usually appears before the cursor at the beginning of a line was replaced by >. When you entered END, you told the turtle you had finished entering the procedure. Notice that the computer tells you the turtle has learned the procedure. The ? reappears before the cursor. To make the turtle carry out the procedure, you must enter the name of the procedure.

HOW TO EDIT A PROCEDURE

Sometimes when you enter a procedure, you may make a typing error, or leave out a command, or enter a command you do not want. When you have a > sign in front of the cursor, you cannot go back to make corrections in a previous line. You must continue to enter the procedure until END.

When the computer gives you the message (shape) DEFINED, you can use a different mode to correct your procedure. This is called the edit mode.

Enter EDIT "RECTANGLE

What line do you see at the bottom of the screen? _____

This means you are in edit mode.

What else do you see on the screen? _____

Note that your cursor covers the T in T0. You will need to move the cursor to the place in the procedure where you wish to make a change. Find the  on the keyboard. Press it one time.

How does the position of the cursor change? _____

Find the  on the keyboard. Press it one time.

What happens? _____

To replace the letter you have erased, type T.

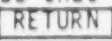
You use the  to move the cursor to the place where you wish to make a change. Move the cursor so that it covers the 5 in the first FD 95 line. Erase the 9. Type in a 7.

The command should now read FD 75.

Move the cursor to the next FD 95 command, and change it so it, too, reads FD 75.

What does the  do in the edit mode? _____

What does the  do in the edit mode? _____

Move the cursor so that it appears in the space after the 0 in the last RT 90 command. Press .

What happens? _____

Type HT. Do not press .

Now you have edited the rectangle so its dimensions are 50 x 75, and you have added HT.

To leave edit mode, press **CONTROL** -C. Hold **CONTROL** down with your left hand. While holding it, press **C** lightly with your right hand.

What happens? _____

Enter RECTANGLE

What happens? _____

HOW TO SAVE A PROCEDURE

You will want to save on a diskette the procedures you teach the turtle, so that you do not have to teach them again every time you go to the computer. Follow the steps below to save the procedure called RECTANGLE.

1. Get a LOGO file diskette from your teacher.
2. Insert the LOGO file diskette and close the door of the disk drive.
3. Enter SAVE "RECTANGLE"

What does the display say when the red light on the disk drive goes off? _____

To see if RECTANGLE is on your diskette, enter CATALOG.

What appears on your screen? _____

Is RECTANGLE on your diskette? _____

HOW TO CLEAR THE MEMORY

Clear the screen. Now enter RECTANGLE to see if the turtle remembers the procedure.

What happens? _____

Now enter ERALL.

What happens? _____

Now enter RECTANGLE.

What happens? _____

The command ERALL means "erase all." When you entered ERALL, you erased the turtle's memory.

If you want to clear your work out of memory so that another student can use the computer after you, what command should you enter? _____

Now clear the screen so that you can complete the assignments.

To make sure you remember the five basic steps in teaching a procedure, review them with your class. Write the steps on the lines below.

HOW TO TEACH A PROCEDURE TO THE TURTLE

1. _____

2. _____

3. _____

4. _____

5. _____

ASSIGNMENT 2

1. Go back to Assignment 1. Turn the set of commands for each drawing into a procedure. (Remember the beginning and ending lines for a procedure.)
2. Make up your own design and write a procedure to teach this to the turtle. If you have time, try this one out on the computer.

LESSON 3 LOAD ", FULLSCREEN, SPLITSscreen

You have now learned how to teach procedures to the turtle and how to save the procedures on a diskette. In this lesson you will learn some ways to use shapes you have saved on your disk.

HOW TO LOAD A PROCEDURE INTO MEMORY

Insert your file diskette in the drive. Close the drive door.

Enter RECTANGLE

What happens? _____

See whether your procedure for RECTANGLE is on the disk.

Enter CATALOG

Is it listed on the disk? _____

The procedure for RECTANGLE is on the disk, but it is not in the computer's memory. To put it in memory, you must load the procedure from the diskette.

Enter LOAD "RECTANGLE

What happens? _____

Enter RECTANGLE

What happens? _____

Clear your screen.

USING A PROCEDURE AS A COMMAND

To see how to use a procedure as a command, clear the screen and enter these lines.

```
RECTANGLE
RT 45
RECTANGLE
RT 45
RECTANGLE
RT 45
RECTANGLE
RT 45
RECTANGLE
RT 45
RECTANGLE
RT 45
```

```

RECTANGLE
RT 45
RECTANGLE
RT 45
HT
FULLSCREEN

```

What does the turtle draw? _____

What happens when you enter HT? _____

What happens when you enter FULLSCREEN? _____

Enter SPLITScreen

What happens? _____

Enter ERALL to clear the memory.

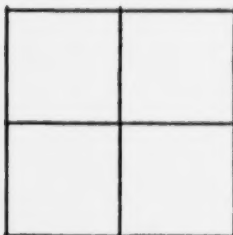
ASSIGNMENT 3

1. Load SQUARE. Use SQUARE to make the rectangle below. Write the steps.



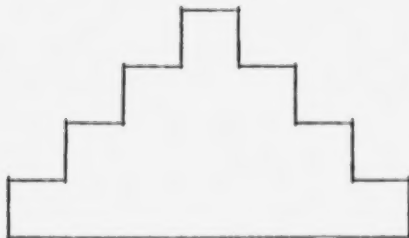
2. Add the two lines you need to turn the commands in #1 into a procedure called DOMINO. Teach the procedure to the turtle. Test it. Make changes, if necessary. Save it when it is correct.

3. Use DOMINO to make the big square below. Write the steps.



4. Add the two lines you need to turn the commands in #3 into a procedure called BIGSQUARE. (Note that the name must be entered as one word.) Teach the procedure to the turtle. Test it. Make changes if necessary. Save it when it is correct.

5. Enter ERALL. Load STAIRS. Use STAIRS to make the step pyramid below. Write the steps.



6. Add the two lines you need to turn the commands in #5 into a procedure called PYRAMID. Teach the procedure to the turtle. Test it. Make changes, if necessary. Save it when it is correct.

LESSON 3 CHALLENGE

Use any shape or shapes you have on your diskette to make an original design. Write the steps and draw the design below.

Title your design and teach it to the turtle as a procedure. Save it when it is correct.

LESSON 4 REPEAT

HOW TO SHORTEN PROCEDURES

Look at the procedure for RECTANGLE which you taught the turtle in Lesson 2. Find this sequence of lines in the procedure:

```
FD 50
RT 90
FD 75
RT 90
```

What four lines follow these? _____

```
_____
_____
_____
_____
```

Notice that the same sequence of four lines is repeated to make the rectangle. We can use this repetition to shorten the way we write the procedure.

Enter this line:

```
REPEAT 2[FD 50 RT 90 FD 75 RT 90]
```

What does the turtle do? _____

You can use REPEAT to make the turtle repeat a series of lines. You put in brackets [] the lines you want the turtle to repeat. Notice where you put the number of times you want the turtle to repeat.

Now, use ERALL to be sure the memory is clear. Clear the screen. Then write a procedure for RECTANGLE using REPEAT.

```
_____
_____
_____
```

What happens when you ask the turtle to RECTANGLE? _____

Look at this procedure which contains repeated lines. Circle the sequence of lines which repeats. How many times is the sequence repeated? _____

```
TO TRIANGLE
FD 50
RT 120
FD 50
RT 120
FD 50
RT 120
HT
END
```

Rewrite the procedure using the REPEAT command.

Teach the procedure to the turtle.

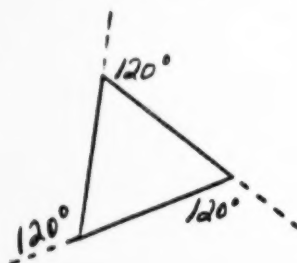
Ask the turtle to TRIANGLE.

What happens? _____

What kind of triangle is described by the procedure? _____

Save TRIANGLE on a diskette. Refer to Lesson 2 if you have forgotten how to do this.

Look carefully at the triangle.



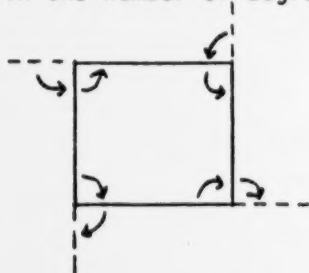
Remember that the procedure told the turtle to turn 120° . Notice on the diagram where the three 120° angles are located. These are called exterior angles because they are outside the triangle. The turtle turns through the exterior angle in order to make the interior, or inside, angle of the triangle. Notice that the sum of the exterior and interior angle at each vertex is 180° .

What is the measure of each interior angle of the equilateral triangle? _____

What is the total number of degrees in the interior angles of this triangle? _____

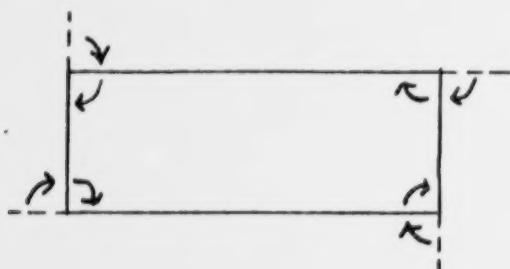
The sum of the interior angles of any triangle is 180° .

Exercise 3: Remember the square you built in Lesson 1. Look at the diagram below. Write in the number of degrees in each interior and exterior angle in the diagram.



What is the total number of degrees in the interior angles of this square? _____

In the diagram below, write in the number of degrees in each interior and exterior angle of the rectangle.



What is the total number of degrees in the interior angles of this rectangle?

The sum of the interior angles of any quadrilateral is 360° .

Exercise 4: Look at the diagram of the equilateral triangle on page 18. Put your finger on the vertices. Add the measures of the two angles marked at the vertex. What is the sum? _____

Add the measures of the two angles marked at each of the other vertices. What is the sum in each case? _____

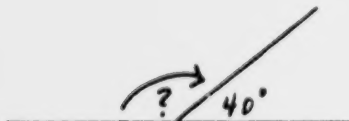
Look at the diagram of the square. Add the measures of the two angles marked at each of the vertices. What is the sum in each case? _____

If you add the angles marked at a vertex in the rectangle, what will be the sum?

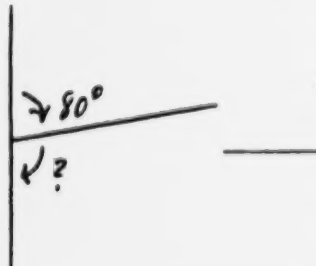
The angles whose measure you have added are called supplementary angles. Any two angles whose sum is 180° are supplementary.

For each of the following angles, find the supplement.

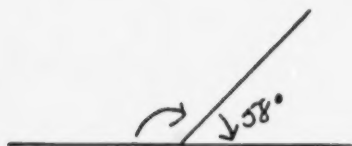
1.



2.

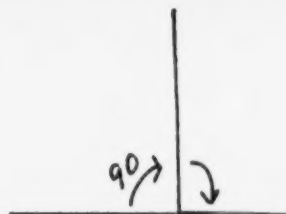


3.



measure of supplement: _____

4.



measure of supplement: _____

Now clear the screen so you are ready to do the assignments.

ASSIGNMENT 4

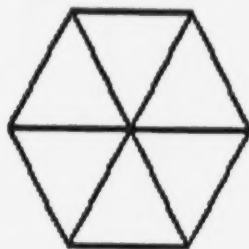
1. Use the TRIANGLE procedure to make this design.



Write the commands you used.

2. Write the procedure for the BOWTIE in number 1.

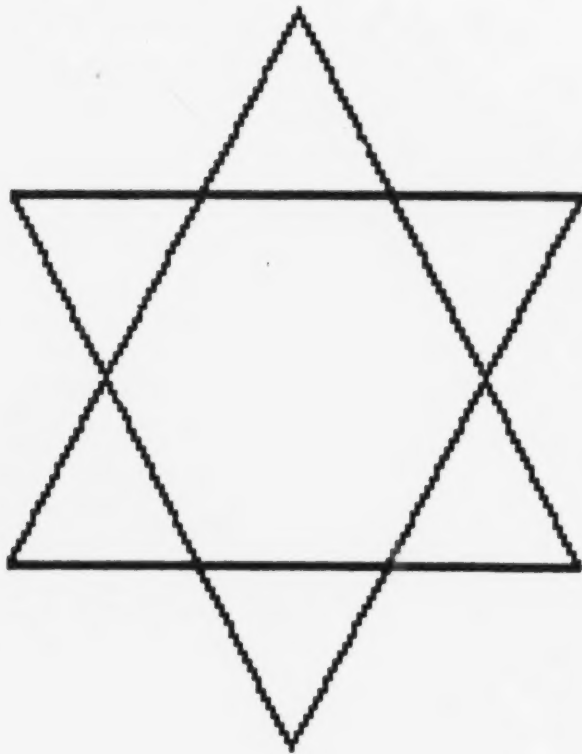
3. Use the TRIANGLE procedure to make this design.



Write the commands you used.

LESSON 4 CHALLENGE

1. Write a procedure that will make the stairs wrap around the screen.
2. Use BOWTIE and REPEAT to write a procedure for this STAR.



LESSON 5 PENUP, PENDOWN, HOME

So far, every time you have moved the turtle on the monitor screen, it has drawn a line. In this lesson you will learn how to move the turtle without drawing.

Load TRIANGLE

USING PENUP AND PENDOWN

Enter ST

What happened? _____

Enter PENUP

What happened? _____

Enter BK 60

What happened? _____

What does PENUP mean? _____

Enter TRIANGLE

What happened? _____

Enter PENDOWN
TRIANGLE

What happened? _____

Enter ST
PENUP
LT 60
FD 30
PENDOWN
TRIANGLE

Notice that when you enter the command PENUP, you can move the turtle without drawing a line on the screen. When you want the turtle to draw again, you must use the command PENDOWN.

Enter ST
PENUP
HOME

What happens? _____

From now on you can use the short names for PENUP and PENDOWN.

PU = PENUP
PD = PENDOWN

ASSIGNMENT 5

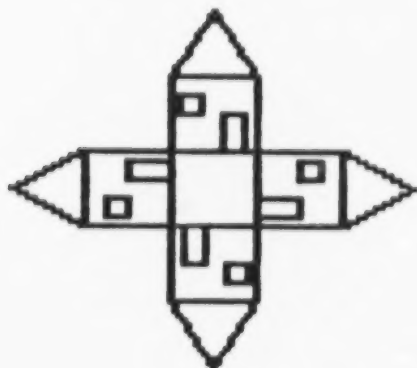
1. You should have 2 triangles on your screen. Make 3 more triangles so that you have a total of 5 triangles on the screen, none of which touch or are connected in any way. Be sure every triangle is totally on the screen.
2. Add more triangles to the screen. What is the largest number of triangles you can get on the screen without having any of them touch or connect? _____
3. Design a procedure to teach turtle how to draw a house that looks like this:



_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

LESSON 5 CHALLENGE

1. Make the turtle draw a circle of houses.



2. Design a town or a city.
3. Teach the turtle how to write your name.

REVIEW AND APPLICATION

1. Write a REPEAT command that will make the turtle draw a square with 73 steps on each side.

Test it and have your teacher check the monitor screen.

2. Write a REPEAT command that will make the turtle draw a rectangle with length = 86 steps, width = 28 steps.

Test it and have your teacher check the monitor screen.

3. Write a REPEAT command that will make the turtle draw an equilateral triangle with 42 steps on each side.

Test it and have your teacher check the monitor screen.

4. Have the turtle draw a scalene right triangle. Have your teacher check the monitor screen.

5. Make the turtle draw an isosceles triangle with 67 steps on each of the equal sides. Have your teacher check the monitor screen. In the space below, sketch your figure. Label the equal sides. Draw in the exterior angles and indicate the degree measure of each. Then figure the degree measure of each interior angle and write the measure on the drawing.

6. A trapezoid is a quadrilateral with exactly 2 sides parallel. The parallel sides are called bases. Make the turtle draw a trapezoid with one base = 30 steps and the other base = 70 steps. Draw your trapezoid in the space below. Label the bases. Draw in the exterior angles and indicate the degree measure of each. Then figure the degree measure of each interior angle and write the measure on the drawing.

LESSON 6 PENERASE

All the shapes you have built so far have used straight lines. In this lesson you will learn how to build a circle by using the basic turn and movement commands.

HOW TO CIRCLE

A circle has 360°.

```
Enter  ST
      LT 90
      PU
      FD 100
      RT 90
      PD
      REPEAT 360 [FD 1 RT 1]
```

What is repeated 360 times? _____

What is created? _____

What is 360° x 1? _____

Now, let's find out how to make the circle bigger.

```
Enter  REPEAT 720 [FD 1 RT 1]
```

What happens? _____

Notice that 720 is 2 times 360. Changing the REPEAT number changes how far the turtle moves in the circular pattern. In this case, it moved around the circle twice (or 720°).

```
Enter  REPEAT 90 [FD 1 RT 1]
```

What happens? _____

What command will make the turtle complete the circle? _____

Enter this command.

```
Enter  REPEAT 360 [FD 1 RT 2]
```

What happens? _____

Notice that when the turtle turned 1 degree 360 times, it went around the circle once. In this new command the turtle turned 2 degrees 360 times for a total of 720°, or two times around the circle.

Write a command that will make the turtle go around the circle 4 times.

What command could you use to have the turtle turn 2 degrees each time, but only cover the circle once?

Test it.

What command could you use to have the turtle turn 4 degrees each time, but only cover the circle once?

Test it.

Enter REPEAT 360 [FD 1.5 RT 2]

What happens? _____

Which of the commands in the REPEAT line do you have to change to make the circle bigger? _____

Clear the screen.

Enter REPEAT 360 [FD 1 RT 1]

Watch the speed at which the turtle draws the circle.

Enter REPEAT 90 [FD 1 RT 4]

Does the turtle make this circle faster or slower than the other circle? _____

The lower the number of repeats, the faster the turtle will draw the circle.

Write a command to make the turtle draw a circle even faster.

Test it.

Clear the screen.

Enter REPEAT 60 [FD 4 RT 6]

Write a command to make the circle larger. _____

Test it.

Write a command to make the circle smaller.

Test it.

How can you make the turtle draw a circle that turns to the left? Write a command here.

Test it.

HOW TO ERASE LINES

You should now have four circles on your screen. To erase the first one the turtle drew, enter

```
PENERASE  
REPEAT 60 [FD 4 RT 6]
```

What happens? _____

Now erase one of the remaining three circles.

To make the turtle write again, use the PENDOWN or PD command.

HOW TO WRITE A PROCEDURE THAT CONTAINS A PROCEDURE

Clear the screen.

Teach the turtle a procedure for a circle which involves 60 repeats.

Test it.

Save this procedure on the class file diskette.

What command do you use to save the procedure? _____

Now you can use CIRCLE as a part of another procedure.

Enter these lines: TO LINK
 FULLSCREEN
 REPEAT 3 [CIRCLE RT 120]
 HT
 END

Then enter LINK

What happened? _____

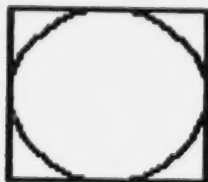
Clear the screen, so you are ready to try the assignment.

ASSIGNMENT 5

1. Make tangent circles.



2. Try to make this circle inscribed in a square.

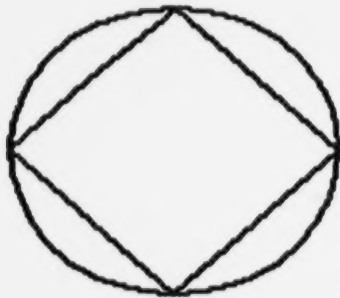


3. Try this.

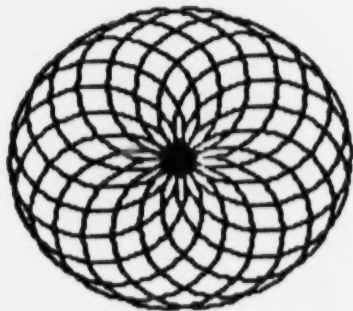


LESSON 6 CHALLENGE

1. See if you can make the turtle draw this square inscribed in a circle.



2. Use the circle to build this PINCUSHION. Teach the procedure to the turtle.



3. Write a procedure which will teach the turtle to draw an animal of your choice. Write your procedure and draw your animal below.

INTRODUCTION TO APPLE LOGO

PART TWO



Spartanburg County School District No. 7
Spartanburg, South Carolina

1984

INTRODUCTION TO APPLE LOGO
PART TWO

Developed by: Carol Ellis
Nan McDaniel

Copyright 1984 Spartanburg County School District No. 7

Spartanburg County School District No. 7
Spartanburg, South Carolina

1984

REVIEWING COMMANDS

In Introduction to Apple LOGO, Part One, you learned how to command the turtle to build shapes.

What two commands make the turtle move across the screen? _____

What two commands make the turtle turn in place? _____

What command will show the turtle on the screen? _____

What command will hide the turtle? _____

What command will send the turtle back to the center of the screen? _____

What command will clear the screen? _____

What command will make the screen show only the picture? _____

What command will make the screen show both picture and text? _____

What command will allow the turtle to move without drawing? _____

What command will make the turtle draw again? _____

Assignment: Write the list of commands that will make the turtle write this message.

Hi!

In Part One you learned these five steps to teach a procedure to the turtle.

1. Build the shape or design. Write down the commands.
2. Write two new lines in the list of commands. The first line should be TO (name of shape). The last line should be END. Enter all of the lines of the procedure.
3. When the computer says (shape) DEFINED, enter the name of the shape to test the turtle.

4. If the turtle fails the test, edit the procedure: EDIT " (name of shape)
When you have finished editing, use CONTROL -C to leave the editor. Go back step 3.
5. If the turtle passes the test, save the procedure on your file disk:
SAVE " (name of shape)

Assignment: Use these steps to teach the turtle how to HI. Remember to save your procedure on your file diskette.

After you have saved your procedure, remember to enter ERALL to clear the memory.

LESSON 6 PENERASE

All the shapes you have built so far have used straight lines. In this lesson you will learn how to build a circle by using the basic turn and movement commands.

HOW TO CIRCLE

A circle has 360° .

```
Enter  ST
      LT 90
      PU
      FD 100
      RT 90
      PD
      REPEAT 360 [FD 1 RT 1]
```

What is repeated 360 times? _____

What is created? _____

What is $360^\circ \times 1$? _____

Now, let's find out how to make the circle bigger.

```
Enter  REPEAT 720 [FD 1 RT 1]
```

What happens? _____

Notice that 720 is 2 times 360. Changing the REPEAT number changes how far the turtle moves in the circular pattern. In this case, it moved around the circle twice (or 720°).

```
Enter  REPEAT 90 [FD 1 RT 1]
```

What happens? _____

What command will make the turtle complete the circle? _____

Enter this command.

```
Enter  REPEAT 360 [FD 1 RT 2]
```

What happens? _____

Notice that when the turtle turned 1 degree 360 times, it went around the circle once. In this new command the turtle turned 2 degrees 360 times for a total of 720° , or two times around the circle.

Write a command that will make the turtle go around the circle 4 times.

What command could you use to have the turtle turn 2 degrees each time, but only cover the circle once?

Test it.

What command could you use to have the turtle turn 4 degrees each time, but only cover the circle once?

Test it.

Enter REPEAT 360 [FD 1.5 RT 2]

What happens? _____

Which of the commands in the REPEAT line do you have to change to make the circle bigger? _____

Clear the screen.

Enter REPEAT 360 [FD 1 RT 1]

Watch the speed at which the turtle draws the circle.

Enter REPEAT 90 [FD 1 RT 4]

Does the turtle make this circle faster or slower than the other circle? _____

The lower the number of repeats, the faster the turtle will draw the circle.

Write a command to make the turtle draw a circle even faster.

Test it.

Clear the screen.

Enter REPEAT 60 [FD 4 RT 6]

Write a command to make the circle larger. _____

Test it.

Write a command to make the circle smaller.

Test it.

How can you make the turtle draw a circle that turns to the left? Write a command here.

Test it.

HOW TO ERASE LINES

You should now have four circles on your screen. To erase the first one the turtle drew, enter

```
PENERASE  
REPEAT 60 [FD 4 RT 6]
```

What happens? _____

Now erase one of the remaining three circles.

To make the turtle write again, use the PENDOWN or PD command.

HOW TO WRITE A PROCEDURE THAT CONTAINS A PROCEDURE

Clear the screen.

Teach the turtle a procedure for a circle which involves 60 repeats.

Test it.

Save this procedure on the class file diskette.

What command do you use to save the procedure? _____

Now you can use CIRCLE as a part of another procedure.

Enter these lines: TO LINK
 FULLSCREEN
 REPEAT 3 [CIRCLE RT 120]
 HT
 END

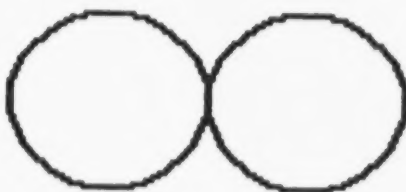
Then enter LINK

What happened? _____

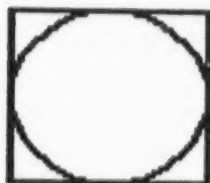
Clear the screen, so you are ready to try the assignment.

ASSIGNMENT 5

1. Make tangent circles.



2. Try to make this circle inscribed in a square.

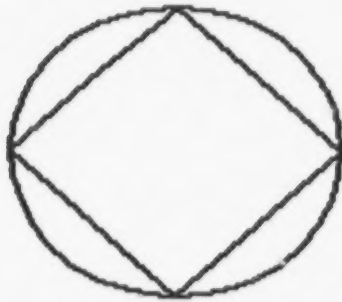


3. Try this.

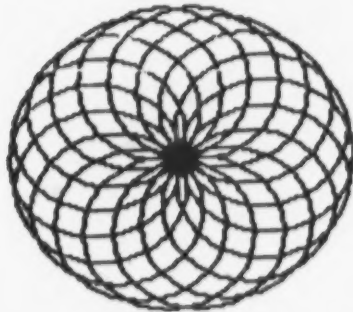


LESSON 6 CHALLENGE

1. See if you can make the turtle draw this square inscribed in a circle.



2. Use the circle to build this PINCUSHION. Teach the procedure to the turtle.



3. Write a procedure which will teach the turtle to draw an animal of your choice. Write your procedure and draw your animal below.

LESSON 7

HOW TO USE VARIABLES IN A PROCEDURE

When you wrote procedures for square, rectangle, and triangle, you produced shapes of a set size. Every time the turtle squares, it makes a square of the same size. It is possible to teach the turtle to square in such a way that you can control the size of the square each time.

Look at this procedure for square:

```
TO SQUARE
REPEAT 4 [FD 10 RT 90]
END
```

What number in the repeat command must be changed in order to produce a different size square? _____

If you replace this number with the name of a variable, you can make the turtle draw any size square you want. This is how you would do it.

```
TO SQUARE SIDE
REPEAT 4 [FD :SIDE RT 90]
END
```

Enter this procedure.

Then enter SQUARE.

What does the turtle say? _____

The turtle needs you to say how long you want the side to be.

Enter SQUARE 15.

What does the turtle draw? _____

Enter SQUARE 30.

What does the turtle draw? _____

To see how the turtle records your procedure, enter EDIT "SQUARE. Note that now the first line reads

```
TO SQUARE :SIDE
```

The turtle has inserted the : in the name of the procedure. The : at the beginning of a word means that the word is a variable.

Save your new square procedure on your disk. Enter SAVE "SQUARE :SIDE. On the lines below, write a procedure for RECTANGLE in which you use the REPEAT command.

```
_____  
_____  
_____
```

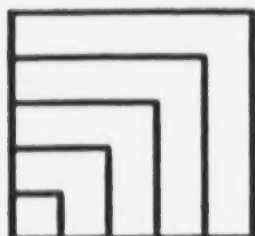
Notice that you have two sides of different lengths in your REPEAT line. One of the sides is the length, the other is the width. You can use variables in this procedure to make a rectangle of any dimensions.

Rewrite the procedure above. This time, instead of the number for the longer side, write :LENGTH. Instead of the number for the shorter side, write :WIDTH. Write your revised procedure here.

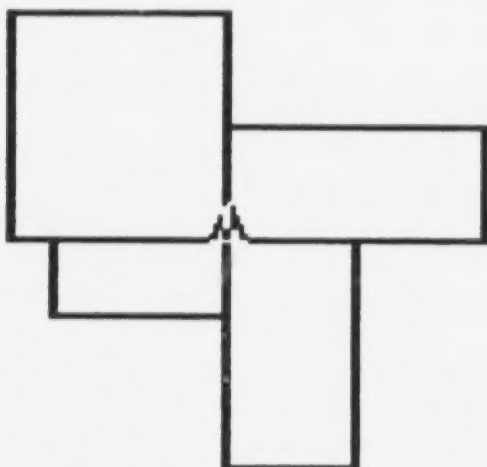
Enter this procedure. Then test it and see how it works. When it is correct, save it on your file diskette.

ASSIGNMENT 7

1. Use your new square procedure to make the turtle draw this.



2. Use your new rectangle procedure to make the turtle draw this. (Hint: Start turtle as shown and rotate the turtle for each new rectangle.)



3. Examine the procedure below. Rewrite it so you can make any size pentagon. Enter the procedure. Test it. Save it when it is correct.

```
TO PENTAGON
REPEAT 5[FD 50 RT 72]
HT
END
```

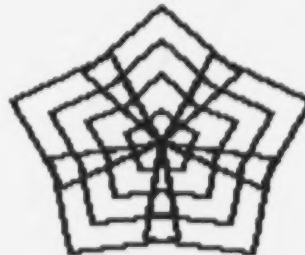
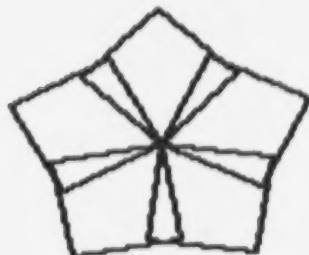
4. The pentagon in #3 is a regular pentagon because all the sides are the same length. It is possible to put regular pentagons of the same size side by side so that they cover an entire surface like the screen. The pattern looks like the one below. It is called a tessellation.



Tessellate your pentagon to cover your monitor screen.

LESSON 7 CHALLENGE

1. Use your new procedures to make these designs.



2. Make your own design which involves a variable and write a procedure for it.

LESSON 8 CIRCLER, CIRCLEL, ARCR, ARCL

HOW TO USE THE VARIABLE CIRCLE FUNCTIONS

Apple LOGO has several built-in functions which use variables.

Enter CIRCLER

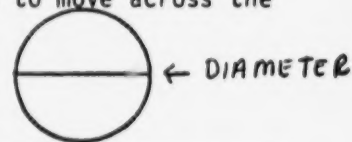
What happens? _____

Enter CIRCLER 40

What happens? _____

Turn the turtle RT 90. How many steps does it take the turtle to move across the circle to the other side? _____

The line the turtle has drawn is the diameter of the circle.



How is the length of the diameter related to your input of 40? _____

What do you think your input of 40 meant to the turtle? _____

The input 40 is the radius of the circle the turtle drew. The radius is the distance from the center of the circle to a point on the circle. The radius is half the length of the diameter. In using the command CIRCLER 40, you asked the turtle to draw a circle with a radius of 40 steps.

Write a command that will make the turtle draw a circle with a radius = 10 steps.

Test the command.

Write a command that will make the turtle draw a circle with a diameter = 116.

Test the command.

Clear your screen.

Enter CIRCLER 40 What happens? _____

Enter CIRCLEL 40 What happens? _____

What do you think the final R in CIRCLER stands for? _____

What do you think the final L in CIRCLEL stands for? _____

HOW TO USE THE VARIABLE ARC FUNCTIONS

The turtle will also draw portions of circles, called arcs. Apple LOGO has built-in functions which use variables to produce arcs of different dimensions.

```
Enter  ARCR 30 90
        ARCL 30 90
```

Draw what the turtle has drawn.

The arc command has the turtle draw a portion of a circle. If the command is ARCR, the turtle will arc to the right. If the command is ARCL, the turtle will arc to the left. What do you think the two variables could stand for?

```
Enter  ARCL 30 270
```

Draw here the figure you now have on your screen.

Add the numbers for the second variable in the two ARCL commands you used. What is the total? _____ How is this total related to a circle? _____

The second variable in the arc command tells the turtle how many degrees to go around the circle. The first variable tells the turtle the radius of the circle it is to use.

Write a command that will make the turtle draw half a circle with radius = 21.

Test it.

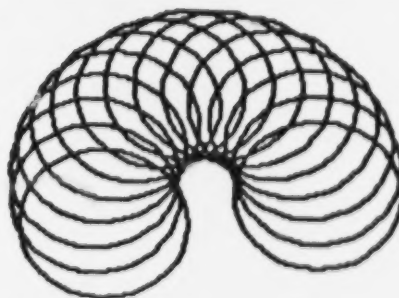
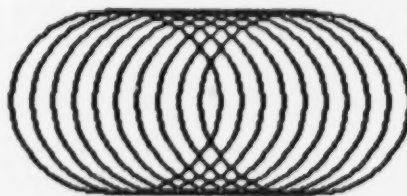
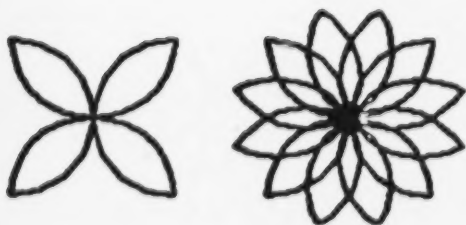
Write a command that will make the turtle complete the circle.

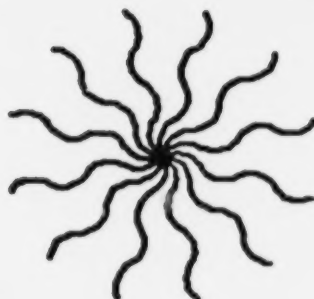
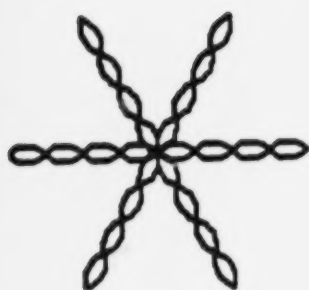
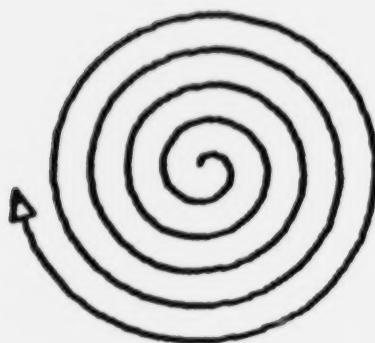
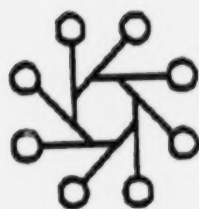
Test it.

ASSIGNMENT 8

1. Make your own design using the built-in circle or arc function. Draw it here and write a procedure for it.

2. Use the built-in arc and circle commands to produce some of these designs.





LESSON 9

DETERMINING PERIMETER

The perimeter of a figure is the distance around it. For example, the perimeter of the square below is 40 steps.

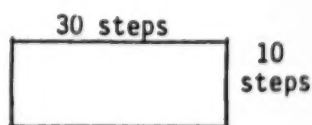


$$10 \text{ steps} + 10 \text{ steps} + 10 \text{ steps} + 10 \text{ steps} = 40 \text{ steps}$$

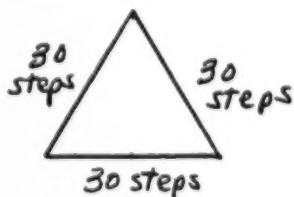
What is the perimeter of this triangle?



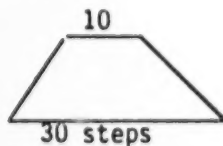
What is the perimeter of this rectangle?



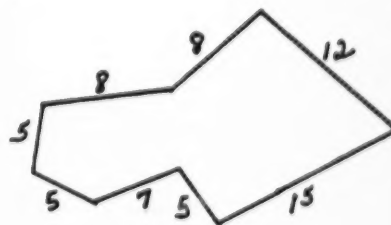
What is the perimeter of this equilateral triangle?



What is the perimeter of this trapezoid?



What is the perimeter of this figure?



BUILDING A FIGURE WITH A GIVEN PERIMETER

How would you build a square with a perimeter of 40 steps? You know that a square has four equal sides. So a square with a perimeter of 40 steps would have 4 sides, 10 steps in length.

Write a procedure which will build a square with a perimeter of 60 steps.

Test the procedure on your screen.

How would you build a rectangle with a perimeter of 100 steps? Remember that a rectangle has four sides. The opposite sides are the same length.

Write a procedure which will build a rectangle with a perimeter of 100 steps.

Test the procedure on your screen.

How many different rectangles with perimeter of 100 steps can you build? Write the dimensions of some of the rectangles in the spaces below.

Are there more? _____

FINDING THE PERIMETER OF A CIRCLE

The perimeter of a circle is called the circumference. You can determine the circumference of any circle the turtle draws with the repeat command you learned in Lesson 6.

Look at this command for a circle.

REPEAT 360 [FD 1 RT 1]

How many steps in all does the turtle take to make this circle? _____
This number is the circumference of the circle.

What is the circumference of the circle below? _____

REPEAT 60 [FD 3 RT 6]

ASSIGNMENT 9

1. Build a square with a perimeter of 114 steps.

Write the dimensions here. _____

2. Build a rectangle with a perimeter of 165 steps.

Write the dimensions here. _____

3. Build a triangle with a perimeter of 180 steps.

Write the dimensions here. _____

4. Build a rhombus with a perimeter of 92 steps.

Write the dimensions here. _____

5. Build a circle with a circumference of 120 steps.

Write the command here. _____

LESSON 9 CHALLENGE

1. Build a regular pentagon with a perimeter of 248 steps.

Write the dimensions here. _____

2. Build a regular hexagon with a perimeter of 144 steps.

Write the dimensions here. _____

3. Build a regular octagon with a perimeter of 240 steps.

Write the dimensions here. _____

4. Build a series of 3 circles, each of which has twice the circumference of the next smaller circle.

Write the commands here. _____

5. Build an isosceles triangle with a perimeter of 150 steps.

Write the dimensions here. _____

6. Build a right triangle with a perimeter of 120 steps.

Write the dimensions here. _____

LESSON 10

MAKING A SQUARE UNIT

Teach the turtle how to make a square unit by entering this procedure:

```
TO SQUNIT
  REPEAT 4 [ FD 10 RT 90 ]
END
```

Test it to make sure the turtle knows how to SQUNIT.
Does it work? _____

Save it on your diskette.
Clear your screen.

FINDING THE AREA OF A FIGURE

The area of a figure is equal to the number of square units that can fit into the figure. You can use your SQUNIT to determine the area of a figure.

Let's try to find the area of a square with a side 60 steps long. Write a procedure for this square.

Teach the procedure to the turtle.

Test it. You should have a large square on your screen.

Enter SQUNIT

What happens? _____

Show the turtle. Then enter these lines.

```
FD 10
SQUNIT
```

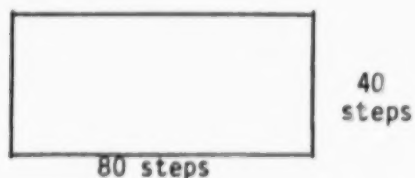
Continue to move the turtle so that it fills the square with squnits. When the square is completely filled, count the squnits in the square. The area of the square is the number of squnits you counted.

area of square = _____ squnits.

Clear your screen so you are ready for the assignments.

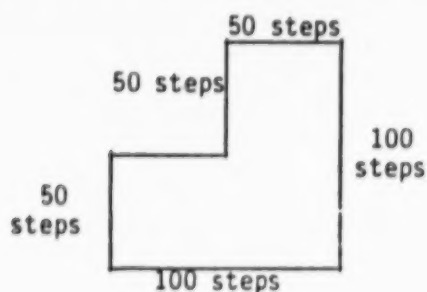
ASSIGNMENT 10

1. Find the area in squnits of this rectangle:



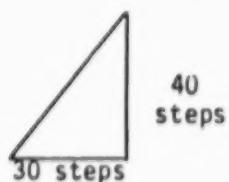
area of rectangle = _____ squnits

2. Find the area in squnits of this figure:



area = _____ squnits

3. Estimate the area in squnits of this triangle:



area = about _____ squnits

4. Estimate the area in squnits of this triangle:



area = about _____ squnits

5. Have the turtle draw a circle with radius = 40. Estimate the area of this circle in squnits.

area = about _____ squnits

6. Enter REPEAT 360 [FD 1 RT 1]. Estimate the area of this circle in squnits.

area = about _____ squnits

LESSON 11

MAKING A CUBIC UNIT

Teach the turtle how to make a cubic unit by entering this procedure:

```
TO CUNIT
HT
REPEAT 4 [FD 30 RT 90]
RT 60
FD 3
REPEAT 3 [PU FD 3 PD FD 3]
LT 60
REPEAT 5 [PU FD 3 PD FD 3]
LT 120
FD 21
LT 150
FD 30
LT 30
FD 21
LT 150
FD 30
BK 30
LT 90
FD 30
RT 90
REPEAT 5 [PU FD 3 PD FD 3]
PU BK 30
PD LT 30
FD 21
END
```

Test it to make sure the turtle knows how to CUNIT.
Does it work? _____

Save it on your diskette.
Clear your screen.

FINDING THE VOLUME OF A SOLID

The volume of a solid is equal to the number of cubic units that can fit into the solid. You can use your CUNIT to determine the volume of a solid.

Let's try to find the volume of the paperbag described in the following procedure. First, teach the turtle how to paperbag.

```
TO PAPERBAG
REPEAT 2 [FD 90 RT 90 FD 60 RT 90]
RT 60
FD 3
REPEAT 3 [PU FD 3 PD FD 3]
LT 60
REPEAT 15 [PU FD 3 PD FD 3]
LT 120
FD 21
LT 180
```

```

FD 21
RT 30
FD 60
RT 150
FD 21
BK 21
LT 60
FD 90
RT 90
REPEAT 10 [PU FD 3 PD FD 3]
PU BK 60
LT 30
PD FD 21
END

```

Test it. You should have a paperbag on your screen. If it is correct, save it on your diskette.

```

ENTER      PAPERBAG
           PU HOME
           PD CUNIT
           ST
           RT 30
           FD 30
           RT 90
           FD 30
           CUNIT

```

What has happened? _____

How many cunits do you think it will take to fill the paperbag? _____

Continue to move the turtle so that it fills the paperbag with cunits. When the bag is completely filled, count the cunits in it.

How does this number compare with your estimate? _____

The volume of the paperbag is the number of cunits you counted.

volume of paperbag = _____ cunits

Clear your screen.

Let's try another one. Teach the turtle how to crate.

```
TO CRATE
REPEAT 2 [FD 30 RT 90 FD 60 RT 90]
RT 60
FD 3
REPEAT 10 [PU FD 3 PD FD 3]
LT 60
REPEAT 5 [PU FD 3 PD FD 3]
LT 120
FD 63
BK 63
LT 150
FD 60
RT 90
FD 30
RT 90
FD 3
REPEAT 8 [PU FD 3 PD FD 3]
PU BK 51
LT 30
PD FD 63
RT 120
FD 30
RT 60
FD 63
END
```

Test it. If it works, save it on your diskette.

Enter CRATE
 PU HOME
 PD

How many cunits do you think it will take to fill the crate? _____

Test your estimate by having the turtle fill the crate with cunits.

How many cunits did you need to fill the crate? _____

What is the volume of the crate? _____

Clear your screen so you are ready for the assignments.

Assignment 11

1. Have the turtle build a solid which has a volume of 8 cunits. Draw your shape and label the dimensions.

2. Build a different solid which has the same volume. Draw your shape and label the dimensions.

3. Build a solid which has a volume of 13 cunits. Draw your shape and label the dimensions.

4. Build a different solid which has the same volume. Draw your shape and label the dimensions.

5. Build another different solid which has a volume of 13 cunits. Draw your shape and label the dimensions.

INTRODUCTION TO APPLE LOGO
PART III



Spartanburg County School District No. 7
Spartanburg, South Carolina

1985

INTRODUCTION TO APPLE LOGO
PART III



Developed by
Carol Ellis and Nan McDaniel

©1985 Spartanburg County School District No. 7

Spartanburg County School District No. 7
Spartanburg, South Carolina

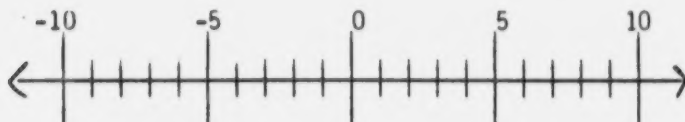
1985

INTRODUCTION TO APPLE LOGO, PART III

This is the fifth in a series of work-study booklets designed to help students use LOGO computer language as a tool to explore concepts in geometry, estimation and problem solving. The focus of this booklet is on the use of LOGO to reinforce concepts of coordinate graphing. The material herein presupposes that the student has completed the previous levels of Introduction to Apple LOGO and that the teacher is providing hands-on experiences with graphing to supplement the work on the computer.

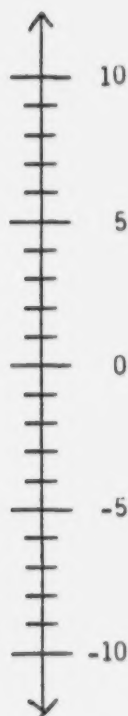
LESSON 12: PR POSITION, SETPOS []

In your study of mathematics you have often seen a horizontal number line. It looks like this:



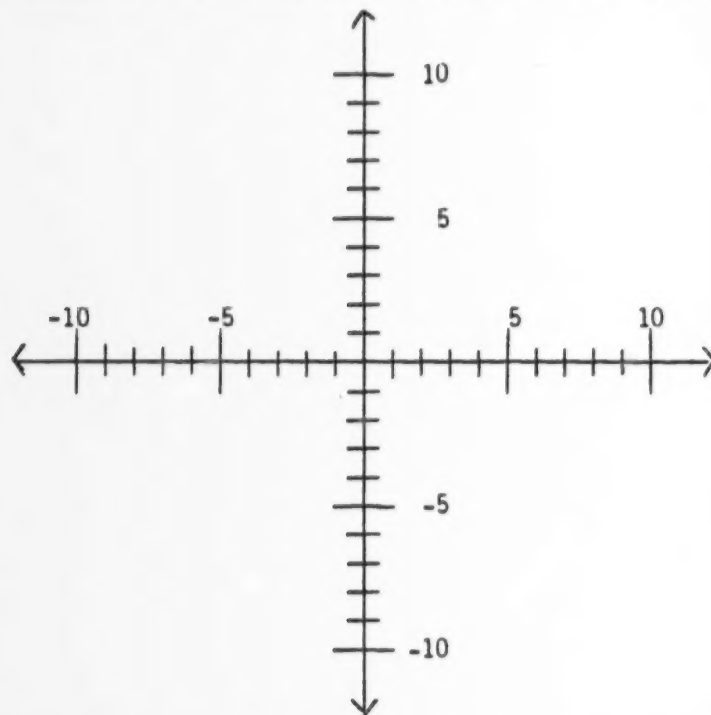
On the number line shown above, locate and label the following points: 3, -7, 8, -1.

A number line may be vertical instead of horizontal. A vertical number line looks like this:



On the vertical number line, locate and label the following points: -2, 6, -9, 4

When a horizontal number line and a vertical number line are superimposed on each other so that the zero points coincide, they form a grid which looks like this:



On the grid the horizontal number line becomes the horizontal axis. The vertical number line becomes the vertical axis. By using the numbers of both horizontal and vertical axes, you can name each point on the plane on which the grid lies.

Since two numbers (one from the horizontal axis and one from the vertical axis) must be used together to name each point on the grid, the grid is called a coordinate grid.

Build a coordinate grid on your monitor screen by teaching the turtle the following procedure:

```
TO GRID
FD 119
HOME
BK 120
HOME
RT 90
FD 139
HOME
LT 90
FD 140
HOME
END
```

Enter GRID

Save GRID on your disk before going on.

Enter GRID

Request the turtle's position by entering this command:

PR POSITION

Write the position shown: _____

This 0, 0 position is called the origin.

Enter these commands.

FD 50
PR POSITION

Write the position shown: _____

Now enter these commands.

HOME
BK 50
PR POSITION

Write position shown: _____

The two numbers are an ordered pair called coordinates.

Which number in the ordered pair stands for the location on the vertical axis - the first or the second? _____

When the turtle is on the vertical axis, what will the first number in the ordered pair (location on the horizontal axis) be? _____

What do you think the second number in the ordered pair stands for? _____

When the turtle is above the horizontal axis, the second number in the ordered pair will be positive.

When the turtle is below the horizontal axis, the second number in the ordered pair will be negative.

Enter HOME

Will the turtle be above or below the horizontal axis when its position is 0, -25?

To check the turtle's position, enter SETPOS [0, -25.]

Is the turtle above or below the horizontal axis? _____

Enter HOME

At what point is the turtle now located? _____

Will the turtle be above or below the horizontal axis when its position is 0. 25?

Check it by entering SETPOS [0. 25.]

Is the turtle above or below the horizontal axis? _____

The command SETPOS means "set the position of the turtle at" the location indicated by the coordinates you give. You must put brackets around the coordinates.

Enter HOME

At what point is the turtle now located? _____

Write a new ordered pair that will place the turtle on the vertical axis above the horizontal axis. _____

Use the SETPOS command to test the coordinates you have written.

Write the command you use. _____

Write a new ordered pair that will place the turtle on the vertical axis below the horizontal axis. _____

Use the SETPOS command to test the coordinates you've written.

Write the command you use. _____

Enter these commands:

```
HOME
RT 90
FD 50
PR POS
```

What is the turtle's position? _____

Enter these commands:

```
HOME
LT 90
FD 50
PR POS
```

What is the turtle's position? _____

Which number in the ordered pair stands for the location on the vertical axis - the first or second? _____

When the turtle is on the horizontal axis, what will the second number in the ordered pair (location in the vertical axis) be? _____

When the turtle is to the right of the vertical axis, the first number in the ordered pair will be positive.

When the turtle is to the left of the vertical axis, the first number in the ordered pair will be negative.

Enter HOME

At what point is the turtle now located? _____

Will the turtle be to the left or right of the vertical axis when its position is -25.0? _____

Check your answer by using the SETPOS command.

Write the command here: _____

Is the turtle to the left or right of the vertical axis? _____

Enter HOME

At what point is the turtle now located? _____

Will the turtle be to the left or right of the vertical axis when its position is 25.0? _____

Check your answer by using the SETPOS command.

Write the command here: _____

Is the turtle to the left or right of the vertical axis? _____

Write a new ordered pair that will place the turtle on the horizontal axis to the left of the vertical. _____

Use the SETPOS command to test the coordinates you've written.

Write the command you use. _____

Write a new ordered pair that will place the turtle on the horizontal axis to the right of the vertical. _____

Use the SETPOS command to test the coordinates you have written.

Write the command you use. _____

You can use the SETPOS command to make the turtle draw. Enter these commands:

```
SETPOS [0. 25.]  
SETPOS [25. 0.]  
SETPOS [0. -25.]  
SETPOS [-25. 0.]  
SETPOS [0. 25.]
```

What shape does the turtle draw? _____

What kind of angle do you think is shown at each vertex of the shape? _____

Use the turtle to test one of the angles. Was your guess correct? _____

What generalizations can you make about the lengths of the sides? _____

Have the turtle measure the lengths of two adjacent sides. What are the lengths of these sides? _____

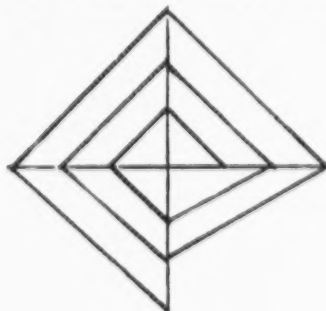
What kind of geometric shape has the turtle drawn? _____

What evidence leads you to conclude this? _____

Return the turtle to the origin.

ASSIGNMENT 12

1. Use the SETPOS command to have the turtle draw two more diamonds, each larger than the one before.
2. Use the SETPOS command to have the turtle draw this spiral.



_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Write down the commands and then teach the procedure.

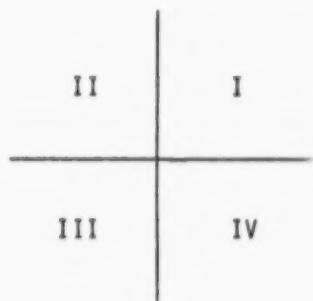
3. Make your own design using the SETPOS command.

Draw your design in the space above. Write down the commands and then teach the procedure.

LESSON 13

Load GRID.

Enter GRID



The grid divides the screen into four quadrants. Quadrant I is at the upper right. Quadrant II is at the upper left. Quadrant III is at the lower left. Quadrant IV is at the lower right. Each quadrant has its own special set of coordinates.

Let's enter two positive coordinates and see in which quadrant the point is located.

Enter PU
SETPOS [13. 16.]

In what quadrant is the turtle now standing? _____

Enter a different ordered pair that will move the turtle to another location in quadrant I. Write your ordered pair here. _____

The numbers in the ordered pair for a point in quadrant I are always positive.

Return the turtle to the origin.

Let's enter two negative coordinates and see in which quadrant the point is located.

Enter SETPOS [-13. -16.]

In what quadrant is the turtle now standing? _____

Enter a different ordered pair that will move the turtle to another location in quadrant III. Write your ordered pair here. _____

The numbers in an ordered pair for a point in quadrant III are always negative.

Have the turtle draw a line from a point in quadrant III to a point in quadrant I. Write here the commands you use.

The numbers in an ordered pair for a point in quadrant I are always _____.

The numbers in an ordered pair for a point in quadrant III are always _____.

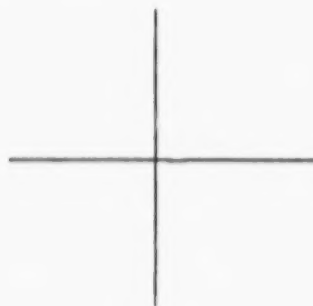
Remember that the first number in the ordered pair names the position of the turtle in relation to the horizontal axis. The second number names the turtle's position in relation to the vertical axis.

ASSIGNMENT 13:

1. Have the turtle draw a triangle in the third quadrant. Use the SETPOS command to name the vertices for the turtle. Draw the triangle in the space below and label the vertices.



2. Have the turtle draw a quadrilateral in the first quadrant. Use the SETPOS command to name the vertices for the turtle. Draw the quadrilateral on the grid below and label the vertices.



3. Have the turtle draw a triangle with one vertex in quadrant III and two vertices in quadrant I. Use the SETPOS command to name the vertices. Draw the triangle on the grid below and label the vertices.



4. Have the turtle draw a quadrilateral with two vertices in the first quadrant and two vertices in quadrant III. Use the SETPOS command to name the vertices. Draw the quadrilateral on the grid below and label the vertices.



5. Create your own design using only PU, PD, SETPOS, and points in quadrants I and III. Draw the design on the grid below and write your commands. Teach and save your procedure.



LESSON 14

Load GRID.

Enter GRID



In this lesson we will look at quadrants II and IV. The ordered pair for a point in either of these quadrants has one negative number and one positive number. The location of the negative number in the ordered pair will tell you in which quadrant the point is located.

Let's enter an ordered pair with one positive and one negative number and see where the turtle goes.

Enter PU
SETPOS [20. -20.]

In what quadrant is the turtle now standing? _____

To move the turtle to quadrant IV you must be sure that the first number in the ordered pair is positive and the second number is negative.

Enter a different ordered pair that will move the turtle to another location in quadrant IV. Write your ordered pair here. _____

Return the turtle to the origin.

Let's enter another ordered pair with one positive and one negative number and see in which quadrant the point is located.

Enter SETPOS [-20. 20.]

In what quadrant is the turtle now standing? _____

To move the turtle to quadrant II you must be sure that the first number in the ordered pair is negative and the second number is positive.

Enter a different ordered pair that will move the turtle to another location in quadrant II. Write your ordered pair here. _____

Return the turtle to the origin.

Remember that the first number in the ordered pair names the turtle's position in relation to the horizontal axis. The second number names the turtle's position in relation to the vertical axis. If you remember this, you should be able to tell from the coordinates of any point the quadrant in which it would be located.

EXERCISE 14:

For each ordered pair below, tell in which quadrant the point is located. Then check your work by using the SETPOS command to move the turtle.

1. [-35. 13.] _____
2. [50. 30.] _____
3. [0. 0.] _____
4. [65. -48.] _____
5. [-26. -60.] _____
6. [0. -42.] _____
7. [80. -15.] _____
8. [-90. 10.] _____
9. [75. 0.] _____
10. [-33. -71.] _____

Have the turtle draw a line from a point in quadrant II to a point in quadrant IV. Write here the commands you use.

Have the turtle draw a line from your point in quadrant IV to a point in quadrant I. Write your command here.

Have the turtle draw a line from your point in quadrant I to a point in quadrant III. Write your command here.

Have the turtle join the point in quadrant III with the first point you used in quadrant II. Write your command here.

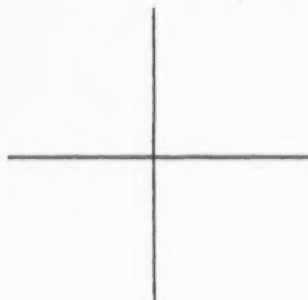
Draw what the turtle has drawn. Label the four points used to create the shape.



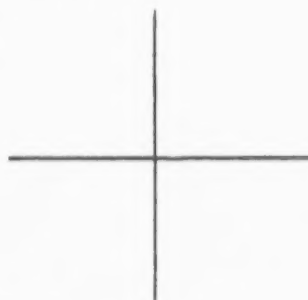
Clear the screen and enter GRID.

ASSIGNMENT 14

1. Have the turtle draw a square with one vertex in each quadrant. Use the SETPOS command to name the vertices for the turtle. Draw the square on the grid below and label the vertices.



2. Have the turtle draw a rectangle with one vertex in each quadrant. Use the SETPOS command to name the vertices for the turtle. Draw the rectangle on the grid below and label the vertices.



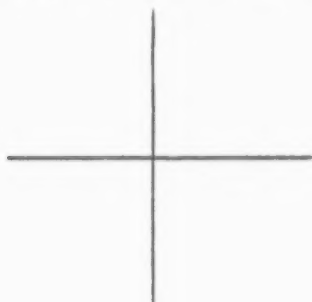
3. Have the turtle draw a trapezoid with one vertex in each quadrant. Use the SETPOS command to name the vertices for the turtle. Draw the trapezoid on the grid below and label the vertices.

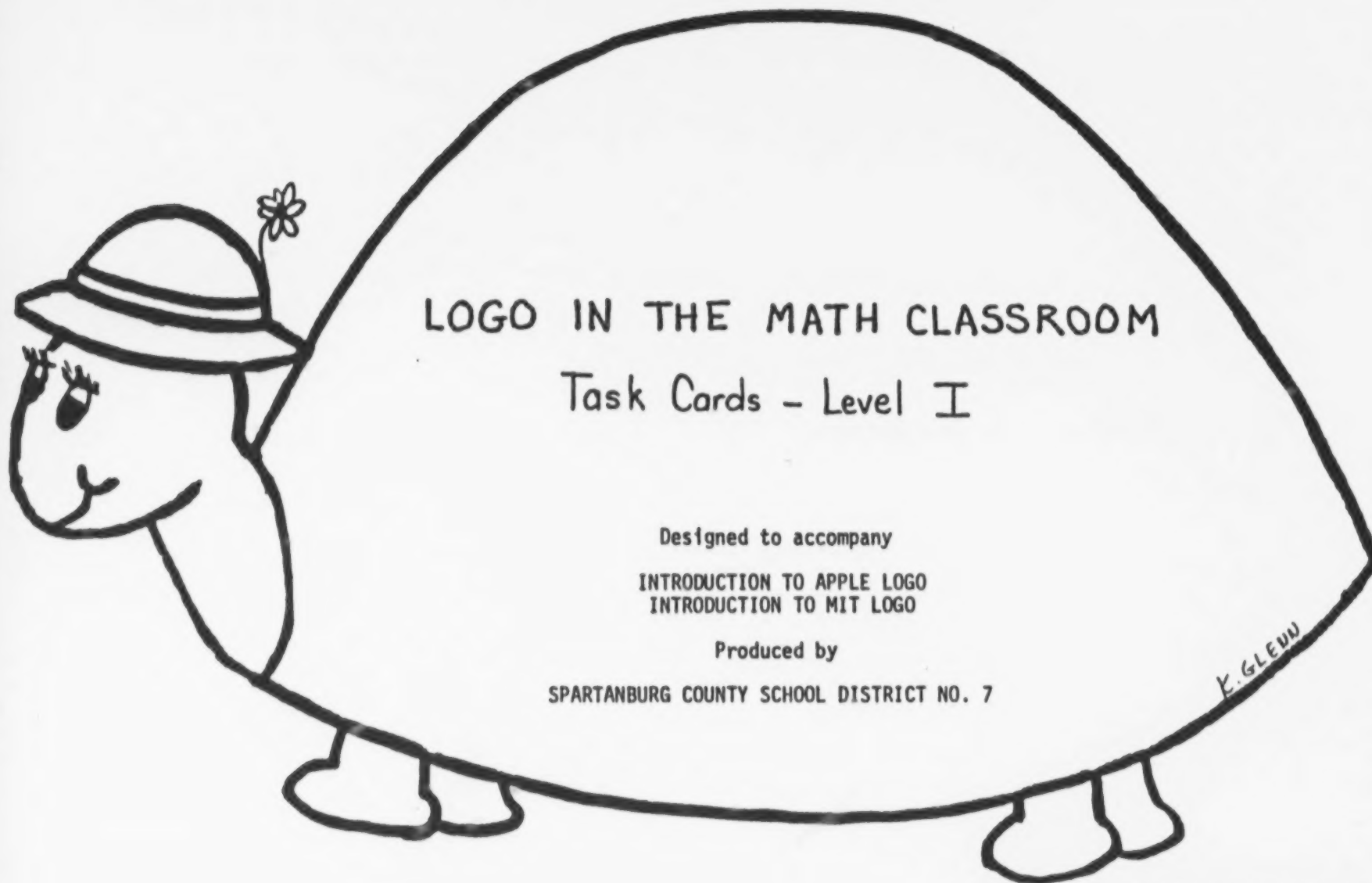


4. Have the turtle draw a rhombus with one vertex in each quadrant. Use the SETPOS command to name the vertices for the turtle. Draw the rhombus on the grid below and label the vertices.



5. Create your own design using points in all four quadrants. Draw the design below. Write your commands and teach and save your procedure.





LOGO IN THE MATH CLASSROOM

Task Cards - Level I

Designed to accompany

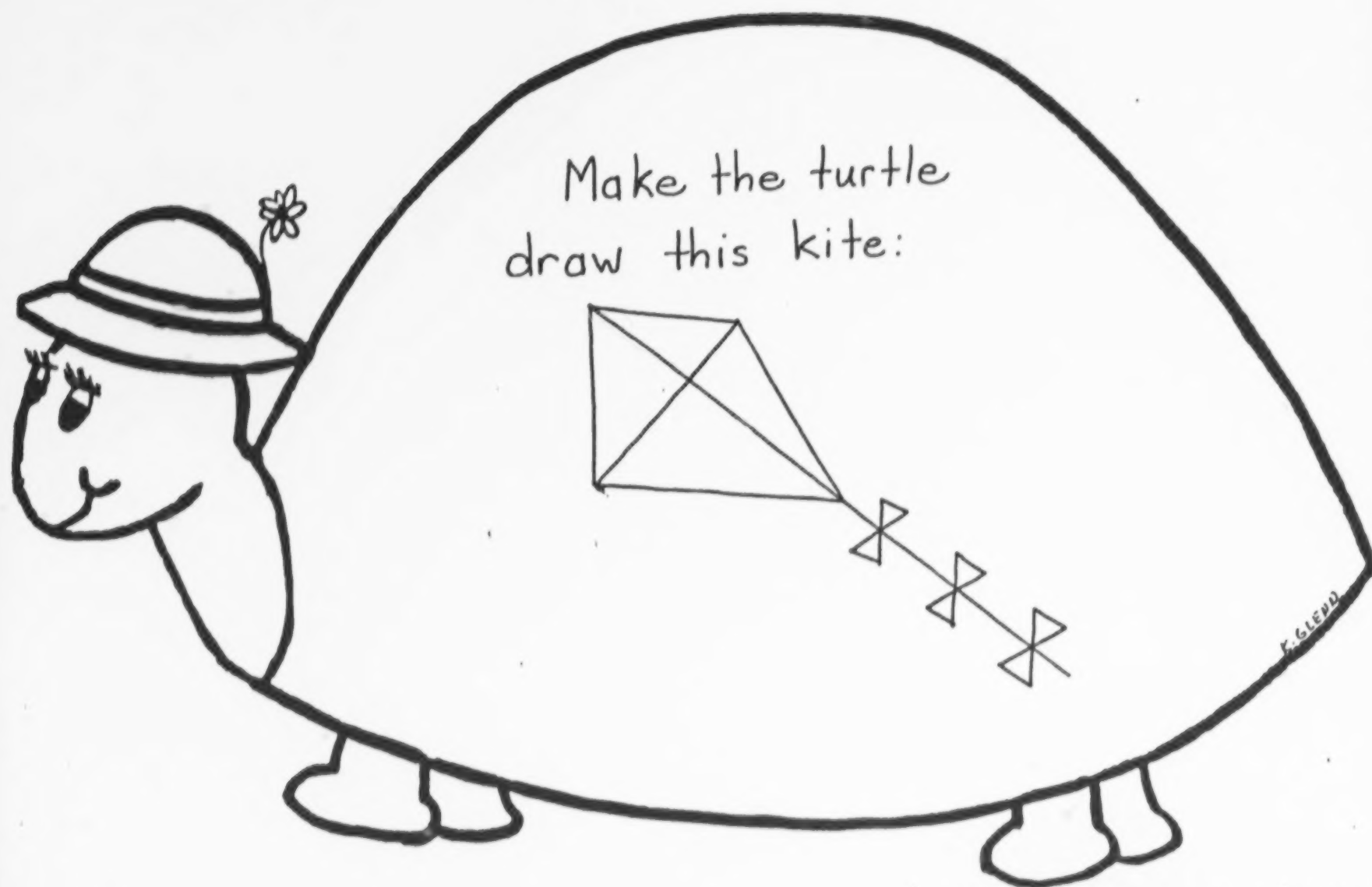
INTRODUCTION TO APPLE LOGO
INTRODUCTION TO MIT LOGO

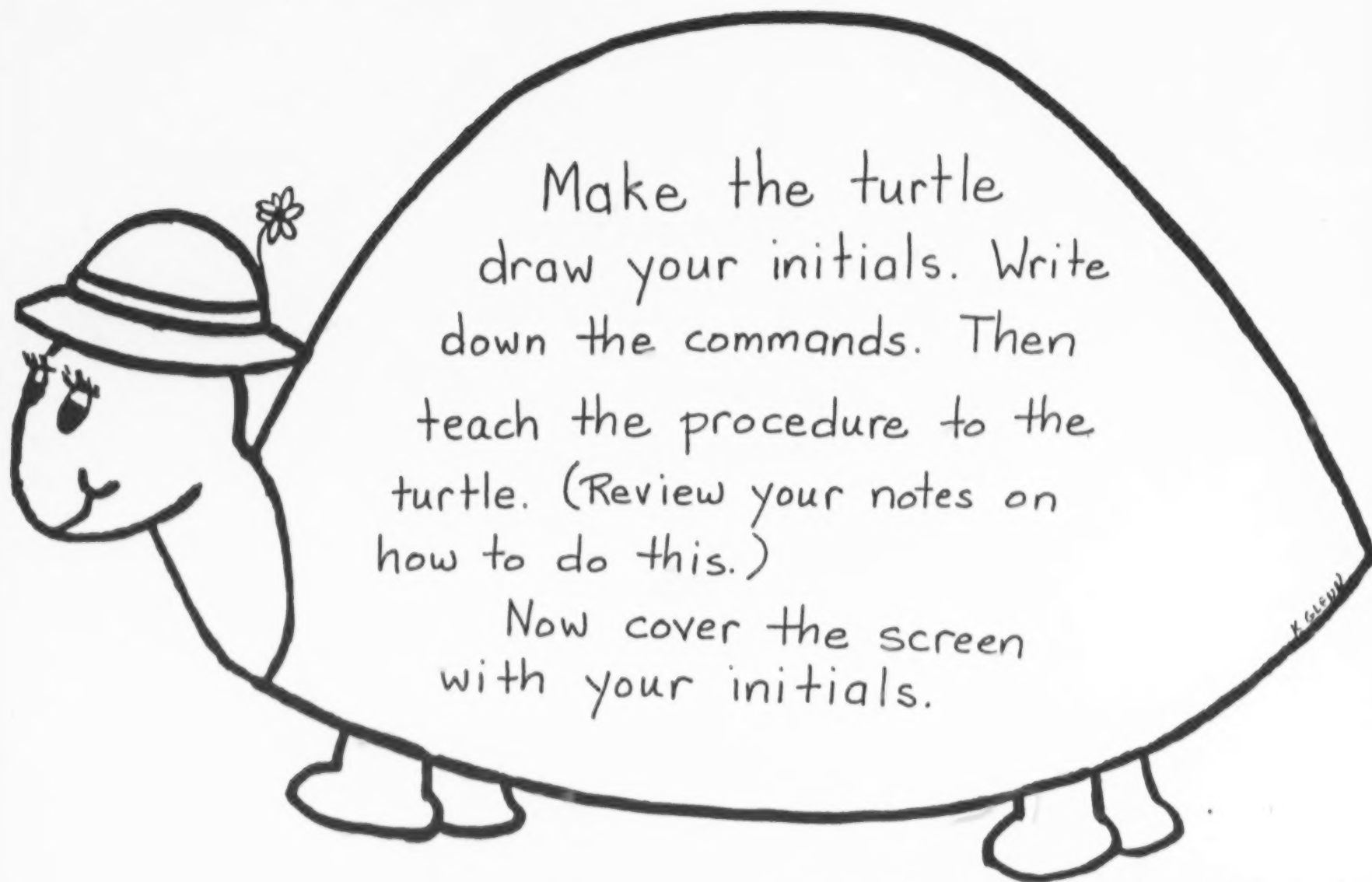
Produced by

SPARTANBURG COUNTY SCHOOL DISTRICT NO. 7

K. GLENN

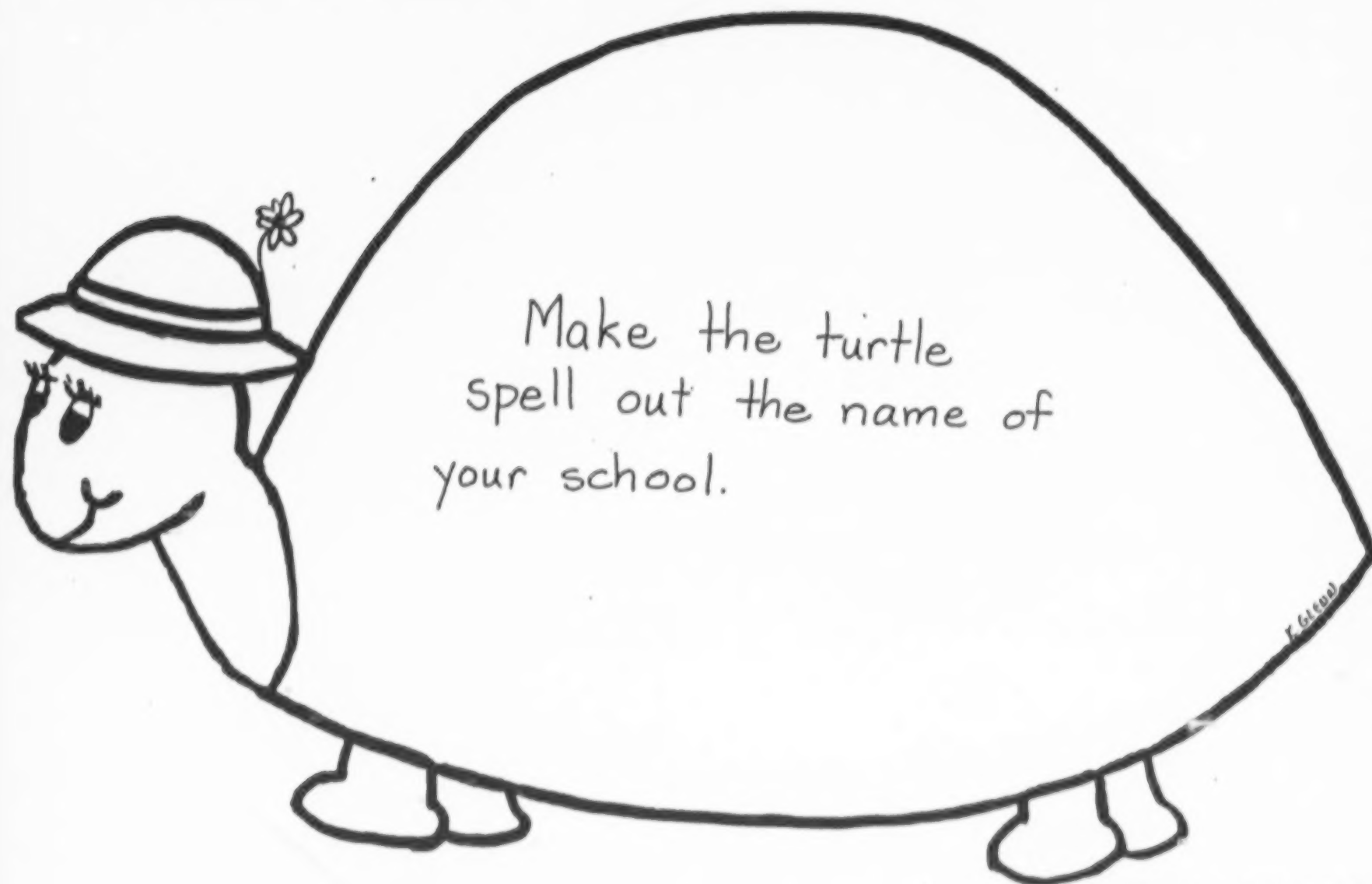
Activities by Carol Ellis and Suzanne McDaniel
©1985 Spartanburg County School District No. 7
Spartanburg, South Carolina





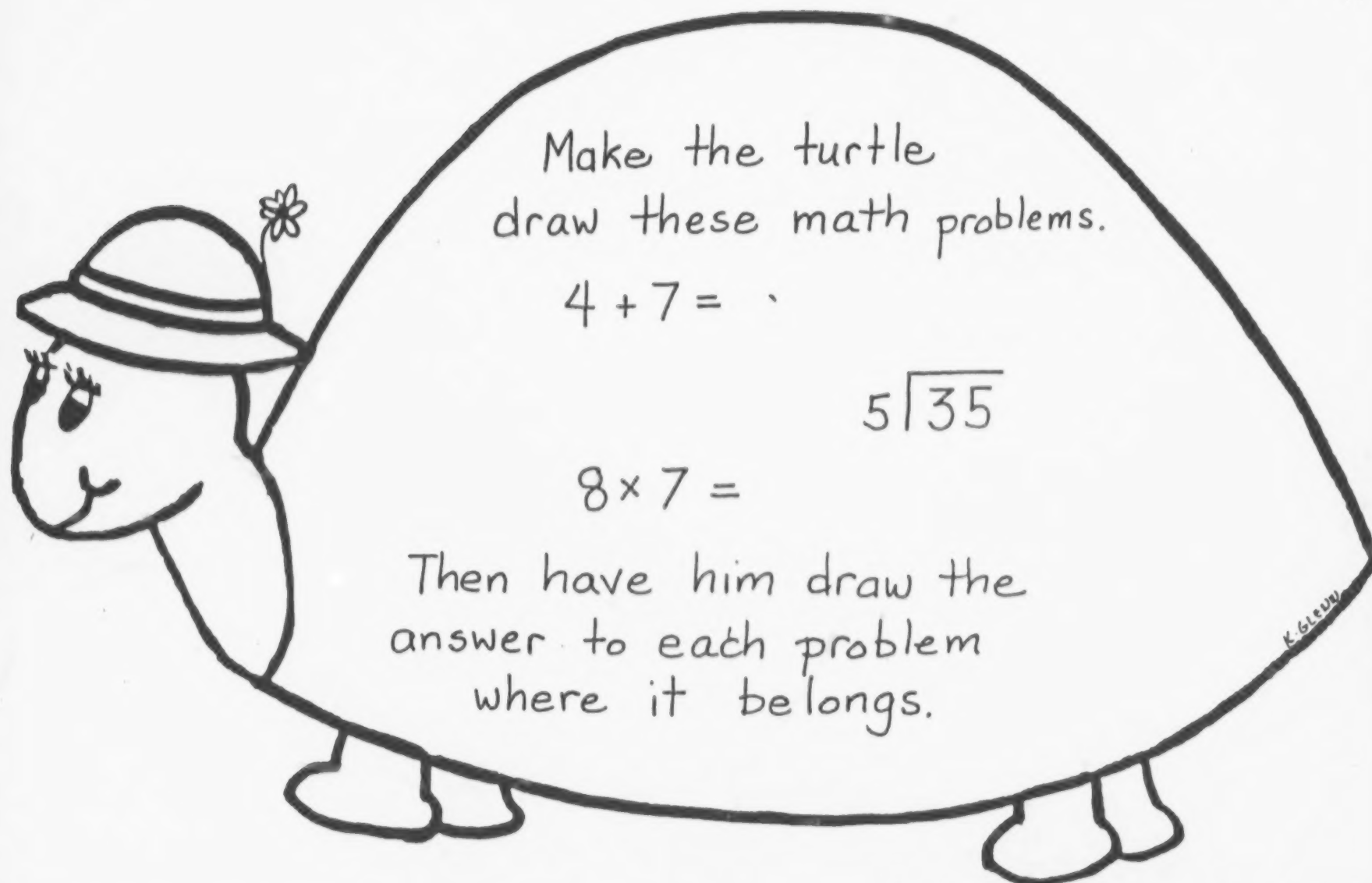
LOGO IN THE MATH CLASSROOM

Activities by Carol Ellis and Suzanne McDaniel
©1985 Spartanburg County School District No. 7
Spartanburg, South Carolina

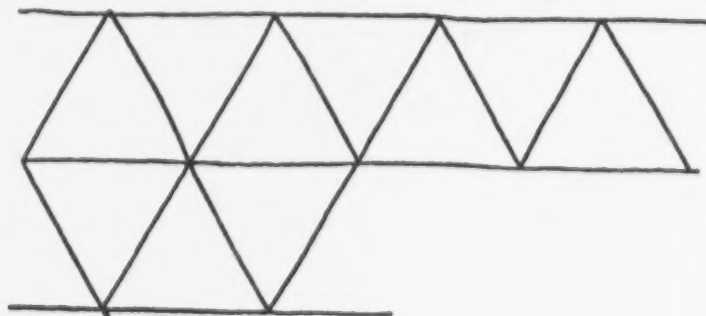


LOGO IN THE MATH CLASSROOM

Activities by Carol Ellis and Suzanna McDaniel
©1985 Spartanburg County School District No. 7
Spartanburg, South Carolina



Have the turtle
cover the screen with
equilateral triangles so
it looks like this:



Be sure to cover the
whole screen!

K GLENN



Have the turtle
draw an animal or bird
of your choice. Write down
the commands. Teach the
procedure to the turtle. Save
it on the class file disk.
Sketch it on notebook paper
to show your teacher.

K-6-LEDD

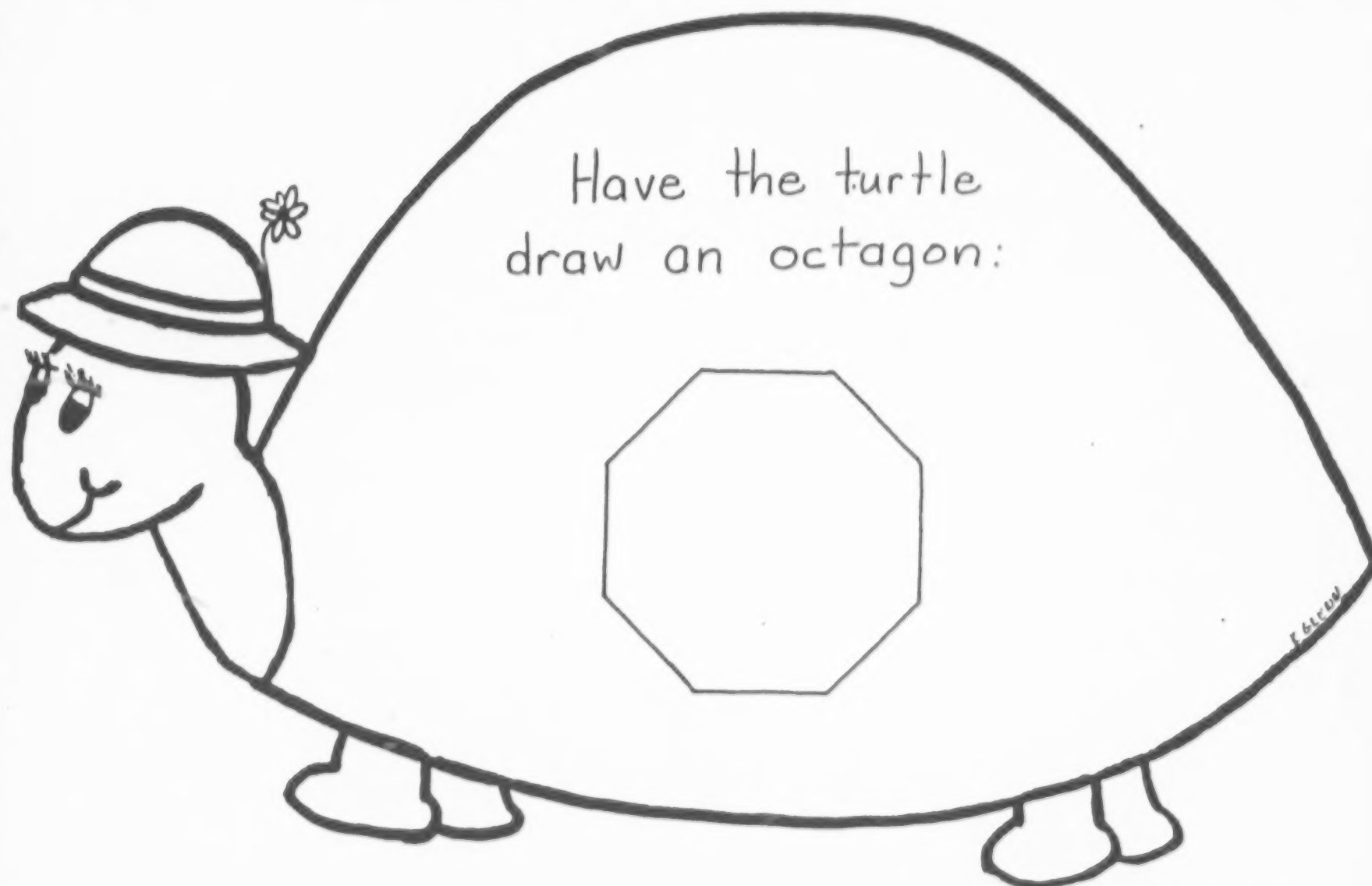
CHALLENGE

Have the turtle draw
this shape:



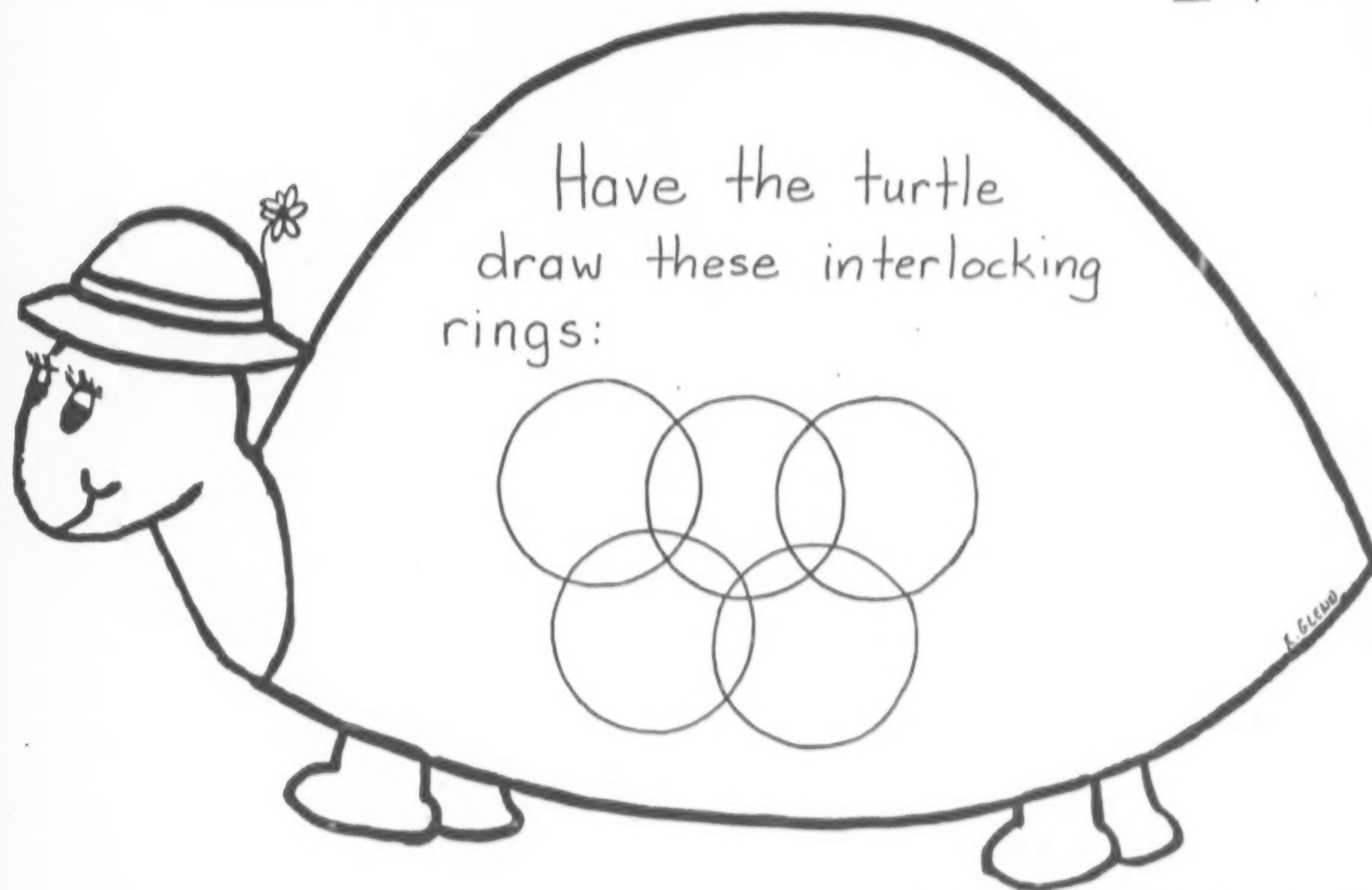
Teach it as a procedure.
See what kinds of designs
you can make using this
procedure and the repeat
command. Sketch the designs
for your teacher.

K. BLEW



LOGO IN THE MATH CLASSROOM

Activities by Carol Ellis and Suzanne McDaniel
©1985 Spartanburg County School District No. 7
Spartanburg, South Carolina

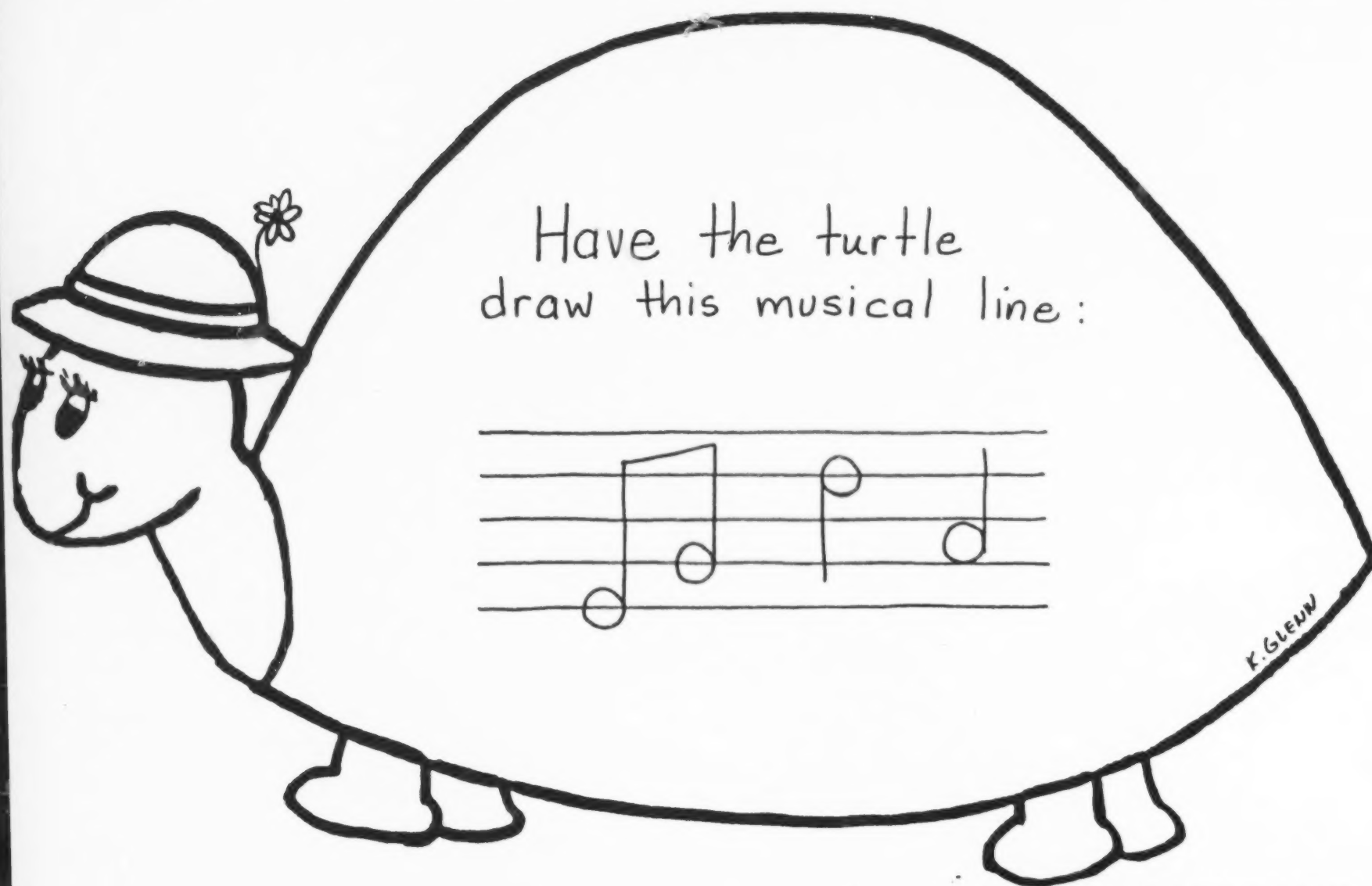


Have the turtle draw
this balloon:



LOGO IN THE MATH CLASSROOM

I-11



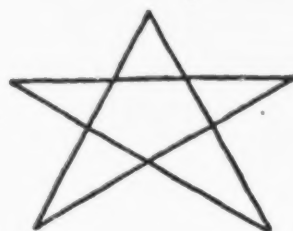
LOGO IN THE MATH CLASSROOM

96

Activities by Carol Ellis and Suzanne McDaniel
©1985 Spartanburg County School District No. 7
Spartanburg, South Carolina

97

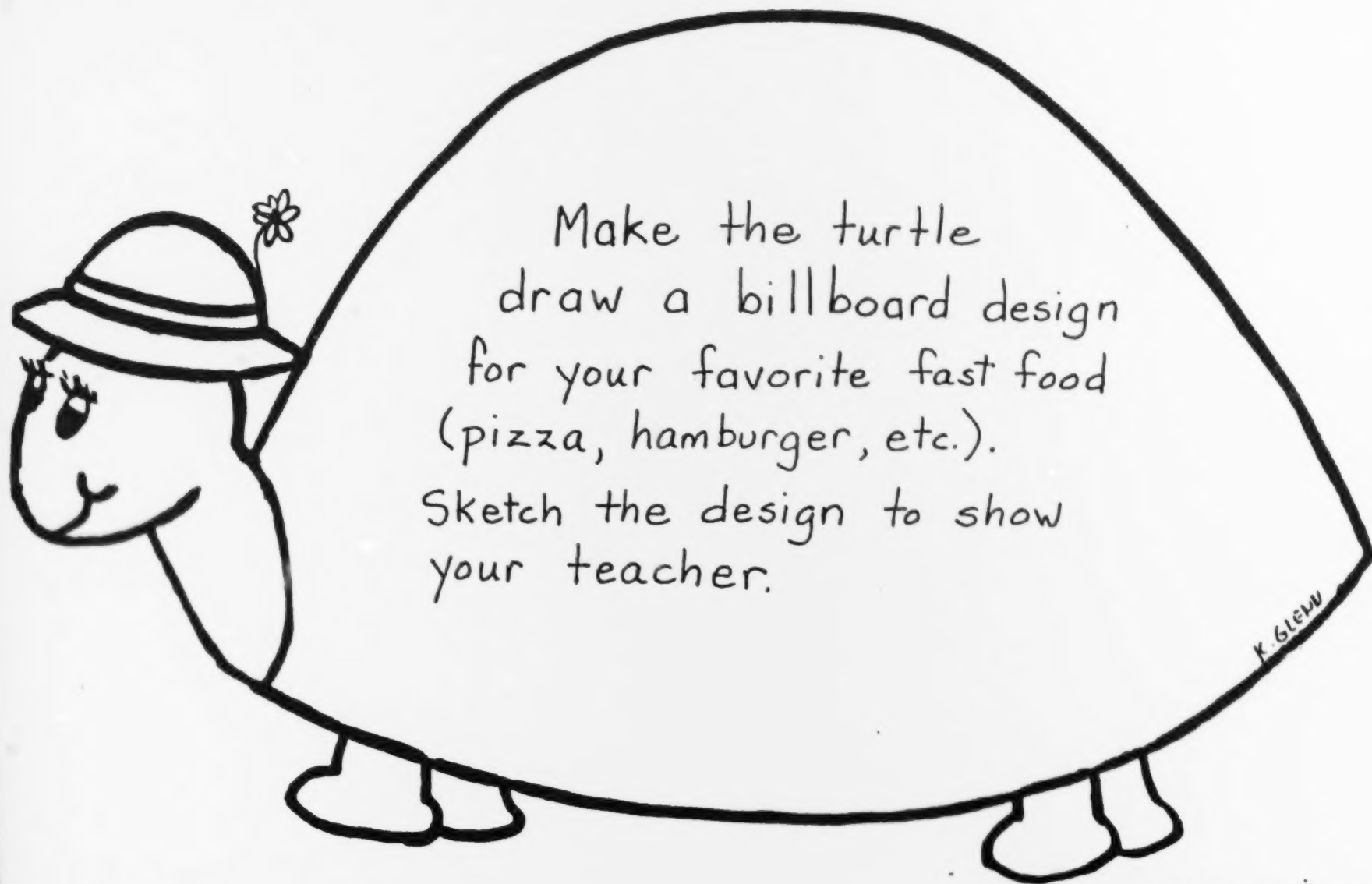
Have the turtle
draw a 5-pointed star.



Write down the commands.
Then teach the procedure
to the turtle.

Cover the screen
with stars.

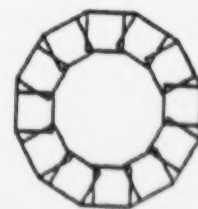
K. GLENN



Make the turtle
draw a billboard design
for your favorite fast food
(pizza, hamburger, etc.).
Sketch the design to show
your teacher.

CHALLENGE

Use repeat and a
procedure for SQUARE
to make the turtle draw this
wreath:



K. GLENN

LOGO IN THE MATH CLASSROOM

Activities by Carol Ellis and Suzanne McDaniel
©1985 Spartanburg County School District No. 7
Spartanburg, South Carolina

MY LOGO RECORD

Name _____

I-1	I-2	I-3	I-4	I-5
I-6	I-7	I-8	I-9	I-10
I-11	I-12	I-13	I-14	

Put an X on the number
of each activity when
you finish it.

K. GLENN